



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE FREEMAN-RUGG GENERAL INTELLIGENCE TESTS AS AN AID TO ECONOMY IN SCHOOL ADMINISTRATION

RAY H. BRACEWELL
Burlington High School, Burlington, Iowa

During the past few years school men, engaged in formulating and applying general intelligence tests, have directed their efforts largely in two directions: in the first place, it has been necessary to devise tests so closely related to school work that they indicate the varied ability of students in the classroom; in the second place, it has been necessary to convince the public that testing is desirable. Although at present the tests have not been perfected and the public has not fully realized the value of testing, the time has come to consider the success of tests now in use and to study the means of applying these tests to the solution of practical school problems.

The Burlington High School segregates students in ability groups. The original plan grouped approximately fifty, seventy-five, or one hundred students in one class. This class we arbitrarily divided into two, three, or four equal sections; a teacher was assigned to each section. At the end of six weeks of school work the teachers of the several sections in consultation attempted to rank the students on the basis of their ability to do good school work. The students were then reassigned to ability groups, designated A, B, and C. From time to time, as the character of the work of individuals changed, transfers were made from group to group.

I shall not attempt to discuss the merits of segregating students into ability groups as a means of taking into account individual differences. Granting that such a practice is good, it is obvious that the method of segregating suggested in the preceding paragraph has many disadvantages. To begin with, it means almost a complete reassignment of pupils at the end of the first six weeks

of school. Moreover, we find that a teacher's judgment of his pupils, based on six weeks' class experience, is not sufficiently reliable. Many additional transfers are required after the students have been ranked and reassigned by the teacher. Apparently any method of segregating students into ability groups will cost more than it is worth unless some reliable means are devised for placing students at the time of registration. On the other hand, the school program must be so organized that it is apparent to both students and teachers that transfers can and will be made from group to group as the changing character of the work of individuals demands.

We began to use the Freeman-Rugg General Intelligence Tests in the fall of 1919. Near the end of the first term of six weeks two experienced teachers were selected to assist the principal, so that we were able to give the tests to the English classes during the four supervised-study periods of one day. At the end of the same day we gave the tests to all students not enrolled in English classes. Since that time it has been our custom to give the tests to the eighth-grade graduation classes in their own elementary schools. At frequent intervals we have given the tests to all who have entered our school from outside our own school system. Results, scored according to uniform standards, have been entered upon the record cards in the office. Additional information, such as the number graduating in the student's own elementary-school class and his rank in that class as estimated by the principal and teachers of his school, has been recorded on these cards. It is therefore possible to learn from office records the point score of a student in the test, his grade-school rank, and his grades in high-school subjects, provided he has been in school one or more semesters.

Consequently we have on file complete information upon which to rank students. Various methods of determining these rankings have been tried. I have already suggested the method of placing students, indiscriminately ranking them on the basis of the judgment of teachers at the end of six weeks. It has been practical to place students in groups on the basis of ranking derived from tests, and then at the end of six weeks re-rank them on the basis

of teachers' judgments. When this has not been feasible, entering Freshmen have at registration been placed in groups on the basis of their rank in the test and their rank in their eighth-grade graduation class. At the end of a week, themes have been written under standardized conditions, corrected, and the necessary transfers immediately made. Assignments have been made to Sophomore classes in English on the basis of the test rank combined with grades in Freshman English; to classes in geometry on the basis of the test rank combined with grades in algebra; to classes in history on the basis of test rank and their last English grade. All of these assignments have been subject to change as the character of the work done by the student made the need of a change in his work evident.

If any test is to be of value, it must show a high degree of reliability for securing the specific measurements desired. It should be clear that the primary value of a test is that it should indicate the character of work that a student will do in a given class to which he is to be assigned. The only way that one can measure the reliability of a test is to compare the manner in which it ranks students with some other method of ranking. Usually this will be a ranking derived from the judgment of one or more teachers.

In the fall of 1919 we indiscriminately assigned ninety Freshmen to four sections of English I, all meeting the first period of the day. Had we followed our old plan, we should have reassigned them at the end of the first six weeks, assigning the best twenty-eight students to Section A, the next forty-six students to two B sections, and the remaining sixteen students to Section C. The natural laws of chance would have operated to cause the transfer of fifty-six students, or 62 per cent of the class. A comparison of the ranking of the tests and the actual ranking which the teachers gave at the end of six weeks shows a positive correlation of 52 per cent. Had we placed the students at registration day on the basis of the tests and reassigned them at the end of six weeks on the basis of teacher judgment, there would have been a greatly reduced percentage of transfers.

Considering these data from another point of view, we see that to be of value tests need not rank students in the same identical order as would the teacher; we do not use them that way. What we need is to be able to divide pupils into relatively large groups. On comparing the two rankings, we found that of the 28 students placed by the tests in Group A, the teachers placed 15 in Section A, 10 in the B sections, and 3 in Section C. Of the 46 placed by the tests in the two B sections, the teachers placed 12 in Section A, 30 in the two B sections, and 4 in Section C. Of the 15 placed by the tests in Section C, the teachers placed 1 in Section A, 5 in the two B sections, and 9 in Section C. A total of 36 would have been transferred. This would have meant a transfer of 39 per cent as compared with the 61 per cent resulting from a chance assignment.

But 39 per cent of pupils transferred from the original assignments is still too large a number. The 39 per cent transfer was derived on the assumption that whenever the test rank differed from the teachers' rank the former was wrong and the latter was right. We now consider that each method of ranking should be given equal value. Taking the ranking of the tests and the ranking of the teachers and combining to secure a final ranking, we find that of the twenty-eight students whom the test placed in Section A, twenty would have been left in Section A, eight transferred to the B sections, and none to Section C. Of the forty-six whom the tests assigned to the B sections, eight would have been transferred to Section A, thirty-four left in the B sections, and four transferred to Section C. Of the sixteen whom the test placed in Section C, the test rank placed none in Section A, four in the B sections, and twelve in Section C. Had this method been followed there would have been a total transfer of twenty-four individuals, or a 27 per cent transfer as compared with the original 62 per cent transfer resulting from a chance assignment. This method has since been used and has been found to operate in accordance with the figures just given.

Although the method just described greatly reduces the probability of transfer at the end of the first six weeks of school, we

are desirous of finding some means of making required transfers earlier in the school year. This fall at the end of the first week of school we had one hundred and seventy-five Freshmen write a theme under standardized conditions. These themes were graded A, B, C, D, and E, following closely the normal distribution curve. The students' intelligence scores were also divided into five groups, likewise following the normal curve. From these two grouped rankings we calculated the regression coefficient and found a correlation of 58 per cent. Combining the rankings of the tests and the themes, we regrouped the students at the end of the first week. Although this earlier readjustment has operated to increase subsequent transfers, the success of the method has been sufficient to justify its continuation.

It will be seen, therefore, that, for the purpose for which we use them, the Freeman-Rugg Intelligence Tests have a high degree of reliability. The question might be raised as to why there should not be a higher degree of agreement between the results of tests and teachers' judgment based on classroom observation. The following study based on data derived from the ninety students in Freshmen English may be of interest. Three students ranked A by the tests were placed in Section C by the teachers. A study of these three revealed that one was a cigarette fiend who was putting practically no effort into his school work. He has since raised his work to the standard required of the B sections. Another was a country girl who had never read a book or written a letter. English was poorly spoken in her home. The third was a girl in such poor health that she was absent from school more than half of the time during the six weeks upon which the teacher's judgment was based. Moreover, of the forty students ranked B by the tests, thirteen were ranked A by the teachers. Investigation showed that these students were of average ability and succeeded through hard, conscientious work. The one student whom the tests ranked C and the teachers ranked A, a girl of nervous temperament, had done herself an injustice in the test. She continued to do good work. Of the other students ranked C in the test, not one ever succeeded in doing good work in the high school.

Recognizing that forces other than those measured by the tests contribute to success in school work, we have tried to combine with the test rank some other ranking based upon such items as effort, regularity of attendance, health, home life, and the many other factors that contribute to success in school. These cannot be measured by general intelligence tests. Whenever a student has been in school a semester we have used school grades to supplement the test grades. This practice has brought about good results. In the case of incoming Freshmen we have given equal value to the ranking of the test and the ranking of the grade-school teachers. This is not so satisfactory as it should be because different standards are used by different schools.

The degree of correlation between the ranking given students by their own schools and the ranking of the tests ranges from a negative correlation in one school to a positive correlation of 91.55 in another school. Last year at the end of the first semester we ranked the grade schools of the city. We placed first the school whose ranking agreed most closely with the ranking of the tests; we placed last the school whose ranking agreed least closely with the test rank. At the end of the second semester we again ranked schools, using the same basis for their order. There was a positive correlation of 16 per cent between the two rankings. This indicated that the teachers whose ranking agreed rather consistently with the ranking of the tests probably based their estimates on the elements measured by the test. In the same way we concluded that teachers whose ranking disagreed consistently with the ranking of the test probably based their estimates on elements that are not measured by the test. Again, the fact that the test and the high-school teachers' rankings more nearly correlated than did similar rankings by grade teachers convinced us that high-school teachers are likely to emphasize most the qualities measured by the tests and that, in general, grade-school teachers are inclined to take into consideration qualities other than those measured by the tests. I realize that data secured from two semesters only are not sufficient to justify putting too much confidence in this conclusion. However, since the primary effort is to secure some data that will

supplement information received from the tests, and since the evidence suggests that the grade-school teachers, in making their rankings, do emphasize qualities that are not measured by the tests, we have decided to use the ranking of the grade-school teachers as an aid to interpreting doubtful cases of assignment. In the end, however, a student's ability to do the work of a section is the criterion that determines the final placement. What we desire of the test is that it shall give us information in advance that will reduce the necessity for numerous transfers after registration.

Our experience indicates that the giving of tests is worth while. The Freeman-Rugg tests have been reliable when compared with other judgments that we have been able to make. They are simple and easy to give. They are group tests and are therefore practicable for use in large numbers. They are point tests; they make possible ready comparison of scores. May I repeat that we have given these tests for the purpose of placing students so as to reduce materially the number of transfers. We have found the Freeman-Rugg tests most reliable when used in connection with some other estimate that tends to take into consideration such qualities as willingness to work, perseverance, health, regularity of attendance, home life, and the general spirit of co-operation.